The 1989 Revisions of the US Standard Certificates of Live Birth and Death and the US Standard Report of Fetal Death

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Abstract: The US Standard Certificates and Reports are models used by state vital statistics offices to develop documents for the collection of data about vital events. The 1989 revisions incorporate some major modifications to previous versions. Both the Standard Certificate of Live Birth and the Standard Report of Fetal Death utilize a checkbox format to elicit information on medical and other risk factors affecting the pregnancy, complications of labor and/or delivery, obstetric procedures, method of delivery, congenital anomalies, and abnormal conditions of the newborn. Revisions to the Standard Certificate of Death include modifications to the medical certification section and the addition of decendent's educational attainment. Items requesting information about Hispanic origin are added to all of these documents. The rationale behind these changes and their intended use are discussed. (*Am J Public Health* 1988; 78:168–172.)

Introduction

In the United States, vital statistics are collected through a decentralized cooperative system. Responsibility for the registration of births, deaths, and other vital events is vested in 57 independent registration areas.* In order to ensure the uniformity necessary for national vital statistics, the responsible national agency, currently the National Center for Health Statistics (NCHS), periodically issues recommended standards, including model laws and regulations, uniform definitions, and reporting forms. The latter are the US Standard Certificates and Reports.[1]

The first Standard Certificates for the registration of births and deaths were developed by the Census Bureau in 1900. Early versions were designed to ensure uniformity in the data collected for legal purposes and the computation of measures of population change. The first Standard Certificate of Birth (intended for use with both live births and fetal deaths) collected some demographic data such as parents' race, occupation, and legitimacy status. However, despite periodic (approximately decennial) revisions, little medical data were included on the birth certificate until 1968 when many of the current medical items (e.g., date of last normal menses, month prenatal care began, number of prenatal visits, complications, congenital anomalies) were added.[1]

In contrast, the Standard Certificate of Death has always captured significant medical information, particularly the cause of death. Items related to the manner of death were added in 1910, and detailed items concerning injury-related deaths were added in 1930. A separate form for reporting fetal deaths, containing items from both the birth and the death certificates, was introduced in 1930.[1]

To date, the US Standard Certificates have undergone 11 revisions. The revision process, a cooperative effort between the states and the federal government, utilizes an expert panel that recommends certificate modifications to NCHS. The Panel to Evaluate the US Standard Certificates and Reports for the 1989 revision consisted of 30 members who represented a wide range of disciplines and organizations including professional associations, health care providers, researchers, and state and local officials. Input from data providers and users was obtained through written testimony, presentations by selected groups, and through a national survey of over 1,800 individuals and organizations.

The panel's objective was to develop certificates to meet the health data needs of the 1990s, balancing statistical considerations with the legal requirements of the vital statistics system. To do this, the panel adopted two criteria:

- First, items on the Standard Certificates must be needed for personal identification or for establishing the time and place of the event, or must have a high priority among the data needed for scientific or public health purposes.
- Second, the data must be obtainable; i.e., it must be possible to acquire complete and accurate information about the items without imposing an undue burden upon the data provider.[2]

The final certificate revisions were released by NCHS in December 1986 for implementation in states by January 1, 1989. It is expected that some states will implement changes prior to that date.

US Standard Certificates

Live Birth/Fetal Death

The 1989 US Standard Certificate of Live Birth and the US Standard Report of Fetal Death are major departures from the previous revisions. While many of the items needed for legal purposes (e.g., child's name) remain unchanged or slightly modified, there are major and significant changes in the "Information for Medical and Health Use" section.

The first, and most obvious, change is the replacement of the open-ended medical items with items having a checkbox format. The items "Complications of Pregnancy" and "Concurrent Illnesses Affecting This Pregnancy" are combined into a two-part item, "Medical Risk Factors for This Pregnancy" and "Other Risk Factors for This Pregnancy" under which more than 20 specific factors are identified

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*The registration areas are the 50 states, New York City, the District of Columbia, Puerto Rico, the Virgin Islands, American Samoa, Guam, and the Trust Territory of the Pacific Islands. Throughout this paper, we refer to them as "states".

38a. MEDICAL RISK FACTORS FOR THIS PREGNANCY
(Check all that apply)

Anemia (Hct. <30/Hgb. <10)	01 ☐
Cardiac disease	02 ☐
Acute or chronic lung disease	03 ☐
Diabetes	04 ☐
Genital herpes	05 ☐
Hydramnios/Oligohydramnios	06 ☐
Hemoglobinopathy	07 ☐
Hypertension, chronic	08 ☐
Hypertension, pregnancy-associated	09 ☐
Eclampsia	10 ☐
Incompetent cervix	11 ☐
Previous infant 4000+ grams	12 ☐
Previous preterm or small-for-gestational-age infant	13 ☐
Renal disease	14 ☐
Rh sensitization	15 ☐
Uterine bleeding	16 ☐
None	00 ☐
Other _____ *(Specify)*	17 ☐

38b. OTHER RISK FACTORS FOR THIS PREGNANCY
(Complete all items)

Tobacco use during pregnancy ..... Yes ☐ No ☐
Average number cigarettes per day _____
Alcohol use during pregnancy ..... Yes ☐ No ☐
Average number drinks per week _____
Weight gained during pregnancy _____ lbs.

FIGURE 1—Risk Factors Affecting This Pregnancy: A Checkbox Item from the US Standard Certificate of Live Birth and the US Standard Report of Fetal Death

for reporting (Figure 1). The items "Complications of Labor and/or Delivery" and "Congenital Anomalies of Child" are also reformatted as checkbox items. Three new items, in checkbox format, request information on "Obstetric Procedures", "Method of Delivery", and "Abnormal Conditions of the Newborn". These items can be used to monitor changing uses of technology in childbirth and to identify babies with specific abnormal conditions at birth.

The reporting accuracy and completeness of many birth certificate items have been well documented. Comparisons of data from the National Natality Survey with birth certificate data demonstrate a high level of agreement for items such as age and race of mother, pregnancy history, birthweight, and APGAR scores.[3] Studies in Georgia[4] and Vermont[5] confirm and expand upon these findings. However, significant problems have been identified with the completeness of reporting of congenital anomaly data collected on previous versions of the Standard Certificate of Live Birth.[6–9] Problems have also existed with the reporting of complications of labor and delivery[4,6] and complications of pregnancy.[6] The replacement of the open-ended questions with checkbox items is an attempt to resolve some of these problems.

The concept of checkboxes as a mechanism for capturing information about complications and congenital anomalies on the birth certificate is not new. It was first suggested by Lilienfeld, *et al,*[10] in 1951. Since then, this format has been successfully implemented in several states.[11,12] The most common criticism of a checkbox format is that while it encourages the reporting of the responses specifically identified, other responses may go unreported. The response lists recommended for the 1989 Standard Certificate of Live Birth and the Standard Report of Fetal Death items attempt to address this concern. For example, the method of delivery checklist contains all commonly used procedures. The lists of risk factors, complications of labor and/or delivery, and abnormal conditions of the newborn are taken from the Hollister Maternal/Newborn Record System,[13] a data collection instrument that is widely used in obstetric offices. Finally, the congenital anomalies checklist is organized by major body systems, with space under each category to enter other anomalies not listed (Figure 2). These approaches are intended to ensure the reporting of the most important and/or the most commonly occurring responses. However, because there are stringent time requirements for filing birth certificates, we expect that those anomalies and abnormal conditions not readily identifiable at birth will remain unreported.

Two items which were added to the fetal death report but not added to the birth certificate are the "Occupation and Industry Worked During the Last Year" of the mother and the father. It should be noted that similar items had been on the Standard Certificate of Live Birth and the Report of Fetal Death for many years. Mother's occupation was included from 1900 through 1948 and father's from 1900 through 1967. In 1968, father's usual occupation and industry, which had been on the certificate as a socioeconomic indicator, was replaced by the education of both parents. The occupational items were eliminated because of problems related to reporting inaccuracies and the high costs of coding these data.[14] Recently, there has been renewed interest in collecting parents' occupational data, primarily to assess the impact of work-related environmental exposures on the fetus.[15] Although the panel recognized the importance of obtaining occupational information about births with adverse outcomes, they were reluctant to impose the burden of collecting and coding these data for all births on the states. Nationally, the estimated annual cost of coding the occupational data items on birth certificates is $8 to $12 million.[16] For this reason, these items were not included on the US Standard Certificate of Live Birth. However, in its transmittal letter accompanying the revised Standard Certificates, NCHS encourages states to collect and code these data if resources are available, using the recommended format.

The final major modification to the Standard Certificate of Live Birth and to the Report of Fetal Death is the addition of specific items to identify parents of Hispanic origin. These items will provide information about the fertility experience of the Hispanic population. The panel also developed a general ancestry item, which can replace the Hispanic item in states with small Hispanic populations or with other significant ethnic groups.

The current lack of national data about the Hispanic population has received considerable attention. Recommendations of various groups have addressed the need for uniform reporting of Hispanic origin on vital records.[17] Since the early 1980s, about half of the states, including almost all of those with significant Hispanic populations, have collected Hispanic origin or other ethnicity data on their birth certificates.[18] The Hispanic and ancestry items on the 1989 Standard Certificates reflect the experience of these states.

Certificate of Death

The US Standard Certificate of Death has remained essentially the same for many years. Most of the items on the

43. CONGENITAL ANOMALIES OF CHILD
(Check all that apply)

Anencephalus	01	☐
Spina bifida/Meningocele	02	☐
Hydrocephalus	03	☐
Microcephalus	04	☐
Other central nervous system anomalies *(Specify)* _____	05	☐
Heart malformations	06	☐
Other circulatory/respiratory anomalies *(Specify)* _____	07	☐
Rectal atresia/stenosis	08	☐
Tracheo-esophageal fistula/ Esophageal atresia	09	☐
Omphalocele/ Gastroschisis	10	☐
Other gastrointestinal anomalies *(Specify)* _____	11	☐
Malformed genitalia	12	☐
Renal agenesis	13	☐
Other urogenital anomalies *(Specify)* _____	14	☐
Cleft lip/palate	15	☐
Polydactyly/Syndactyly/Adactyly	16	☐
Club foot	17	☐
Diaphragmatic hernia	18	☐
Other musculoskeletal/integumental anomalies *(Specify)* _____	19	☐
Down's syndrome	20	☐
Other chromosomal anomalies *(Specify)* _____	21	☐
None	00	☐
Other *(Specify)* _____	22	☐

FIGURE 2—Congenital Anomalies of Child/Fetus: A Checkbox Item from the US Standard Certificate of Live Birth and the US Standard Report of Fetal Death

current death certificate have been included since 1939 or 1949. Prior to the current revision, the items required for the medical certification of cause of death had not changed since 1949.[1] The panel was particularly interested in improving the quality of the cause of death data and most of its recommendations for the revised death certificate reflect this concern.

The accuracy of the data reported in the medical certification section of the certificate has been the topic of numerous studies.[19,20] Leadbeatter, in his comparison of death certificates to hospital records, concludes that ". . . an unacceptably large number of medical certificates of cause of death are imprecise or inaccurately completed . . . because of ignorance of, or failure to apply, the principles of death certification and not because relevant information is lacking."[21]

In an effort to ameliorate concerns such as those expressed by Leadbeatter, the panel made three recommendations. First, they included instructions for completing the medical certification section on both the front of the certificate (Figure 3) and, in more detail, on the back. Second, they added additional lines to Parts I and II of the cause of death section to encourage more complete reporting of all of the chronic conditions that may coexist and contribute to death. Third, the Panel acknowledged the need for increased physician training in medical certification and urged the US Department of Health and Human Services to work with such organizations as the American Medical Association to develop and implement programs to improve physician reporting of the causes of death.

Two other factors may affect the accuracy and completeness of the medical certification. First, the certifier's knowledge of the decedent's medical history and final illness may be limited because the certifier had never attended the decedent or had attended him/her for a limited time. Markush, *et al*,[22] concluded that there is a suggestion that short attendence is related to generally less well substantiated diagnoses. It is probably reasonable to assume that this conclusion can be extended to instances in which the certifier has never attended the deceased; i.e., when the medical certification is prepared by a physician other than the attending physician in the attending's absence. A second related factor is the pressure on physicians to complete the medical certification promptly so that funeral arrangements can proceed.[23]

In response to these issues, the panel recommended a provision for two physician signatures. If the attending physician is unavailable and the death is clearly not a medical-legal case, another physician may pronounce and certify to the time and place of death and sign the certificate so that the body can be released to the funeral director. The funeral director must then contact the attending physician to obtain the medical certification at a later time. This system, currently in use in two states, is similar to a recommendation of the College of American Pathologists' National Autopsy Data Bank Committee. That group recommended a two-part death certificate: one part to meet the immediate legal requirements, and a second containing the medical certification and other statistical data which may be completed at a later date.[24] It is anticipated that the revision proposed by the panel will expedite the release of bodies to funeral directors and, at the same time, improve the quality and completeness of the causes of death listed on the certificate.

Consistent with its concern for improved data quality, the panel made an important recommendation regarding death certification that does not appear on the certificate. This recommendation relates to the order in which the causes of death are listed in Part I of the medical certification section. Currently, the *immediate* cause is listed first, followed by *antecedent* causes in order, with the *underlying* cause being listed last (Figure 3). Problems with this causal sequence are common. Lindahl, in his study of 1,224 deaths from rheumatoid arthritis, found inaccurate causal sequences in 35 per cent of certificates. On 56 per cent of the inaccurate certificates, the underlying cause of death assigned by a nosologist was different from that given by the certifying physician.[25] In response to studies such as those by Lindahl, the panel considered reversing the order and listing the underlying cause first (Figure 4) with the resulting conditions listed sequentially on the following lines. The rationale for this proposal was that since this is the logical sequence used by physicians in medical diagnosis and in most medical records, it would result in fewer sequencing errors and improved data quality. However, the panel recognized that this would be a major change in a critical data item. They therefore recom-

27. **PART I.** Enter the diseases, injuries, or complications that caused the death. Do not enter the mode of dying, such as cardiac or respiratory arrest, shock, or heart failure. List only one cause on each line. | Approximate Interval Between Onset and Death

IMMEDIATE CAUSE (Final disease or condition resulting in death) → a. _____ DUE TO (OR AS A CONSEQUENCE OF):

Sequentially list conditions, if any, leading to immediate cause. Enter **UNDERLYING CAUSE** (Disease or injury that initiated events resulting in death) **LAST**

b. _____ DUE TO (OR AS A CONSEQUENCE OF):

c. _____ DUE TO (OR AS A CONSEQUENCE OF):

d.

PART II. Other significant conditions contributing to death but not resulting in the underlying cause given in Part I.

28a. WAS AN AUTOPSY PERFORMED? *(Yes or no)*	28b. WERE AUTOPSY FINDINGS AVAILABLE PRIOR TO COMPLETION OF CAUSE OF DEATH? *(Yes or no)*

29. MANNER OF DEATH	30a. DATE OF INJURY *(Month, Day, Year)*	30b. TIME OF INJURY M	30c. INJURY AT WORK? *(Yes or no)*	30d. DESCRIBE HOW INJURY OCCURRED
☐ Natural ☐ Pending Investigation ☐ Accident ☐ Suicide ☐ Could not be Determined ☐ Homicide				

30e. PLACE OF INJURY—At home, farm, street, factory, office building, etc. *(Specify)*	30f. LOCATION (Street and Number or Rural Route Number, City or Town, State)

FIGURE 3—Cause of Death (Item 27) from the US Standard Certificate of Death

mended that NCHS undertake a study to determine if reversing the sequential order would improve the reporting of causes of death. The recommendation also urges NCHS to complete the study in time to implement the revised format, if warranted, simultaneously with the implementation of the tenth revision of the International Classification of Diseases (ICD-10) for coding cause of death. Implementation of ICD-10 is scheduled for 1993. Unfortunately, to date, NCHS has been unable to obtain funding for this study.

Two statistical items were added to the death certificate. The first is an item to identify decedents of Hispanic origin. An alternative general ancestry item, similar to that described for the birth certificate, is also available for use by states with small Hispanic populations or with other significant ethnic groups. Either of these items will permit an examination of mortality patterns in the Hispanic community. The second new statistical item, decedent's education, is intended to be a proxy measure of socioeconomic status.

Implementation of the Revised Certificates

The US Standard Certificates are models for states, intended to ensure uniform national vital statistics data. Although state adoption of these documents is voluntary, past experience has been good. NCHS uses 33 items on the 1978 Standard Certificate of Live Birth to produce national natality tabulations. Currently, 20 of these items are on state certificates used to report 99 per cent or more of all births occurring in the United States. An additional eight items are included on certificates used to report at least 90 per cent of births, and three more on certificates for reporting at least 80 per cent of births. The only items with less than 80 per cent coverage are the one-minute and five-minute APGAR scores, which are present on 78 per cent of certificates used in the US.**

Reporting uniformity on the Death Certificate is even better. Of the 21 items used by NCHS for national tabulations, 19 are on certificates used to report over 99 per cent of all deaths and one is on certificates used to report 90 per cent of deaths. Only one item—"Was decedent dead on arrival at the hospital?"—is not uniformly reported. This item is present on certificates for reporting 77 per cent of US deaths.**

Although the uniformity of reporting on fetal death reports is not as good, it is still acceptable. Of the 31 items used by NCHS, 18 are on forms used to report 99 per cent of

**Comparisons of state vital certificates with the 1978 U.S. Standard Certificates and Reports. Unpublished data from NCHS, 1984.

27. **PART I.** Enter the diseases, injuries, or complications that caused the death. Do not enter the mode of dying, such as cardiac or respiratory arrest, shock, or heart failure. List only one cause on each line. | Approximate Interval Between Onset

UNDERLYING CAUSE (Disease or injury that initiated events leading to death) → a. _____ RESULTING CONDITIONS IN SEQUENCE OF OCCURENCE:

List resulting conditions, if any, in sequence of occurrence. Enter **IMMEDIATE CAUSE** (Final disease or condition resulting in death) **LAST.**

b. _____ RESULTING IN:

c. _____ IMMEDIATE CAUSE:

d.

PART II. Other significant conditions contributing to death but not resulting in the underlying cause given in Part I.

FIGURE 4—Alternative Format for Cause of Death (Item 27) as Recommended for Future Study

fetal deaths occurring in the US. Five more are on forms used to report at least 90 per cent of events and an additional four are on forms used to report 80 per cent of events. Four items are reported on less than 80 per cent of events including two—"Physician's estimate of gestation" and "Is mother married?"—that have only 65 and 63 per cent coverage, respectively.**

While we hope that this level of uniformity will be maintained, the drastic changes in the certificates make this problematic. In past revisions, many new items had been in use in several states prior to being added to the Standard Certificates. To date, however, only three states make extensive use of checkboxes. Only two utilize the two certifier option on their death certificates. It is therefore difficult to predict the extent of state compliance with the 1989 revisions. One factor that may positively influence state acceptance is funding. This is the first revision since the full implementation of the Vital Statistics Cooperative Program through which NCHS provides financial support to states for the purchase of vital statistics data. NCHS is considering incorporating financial incentives into this funding source to encourage states to comply with the Standard Certificates. Such an action may well affect state decisions about their revisions.

A factor that may work against the adoption of the revised documents by some states is size. The 1989 Standard Certificate of Live Birth measures 8 1/2 by 14 inches, a major change from previous versions which were 7 1/2 by 8 1/2 inches. The new birth certificate is designed to be a two-part or perforated document, the legal section measuring 8 1/2 by 5 inches and the statistical portion measuring 8 1/2 by 9 inches. Since several states have used these models successfully in recent years, the panel felt comfortable in recommending it. Also, a few states are currently utilizing electronic transfer of birth certificate information from the hospital to the state office. This may ultimately make paper size considerations obsolete.

Similar concerns apply to the new death certificate and fetal death report. The death certificate is increased to 8 1/2 by 11 inches, while the report of fetal death measures 8 1/2 by 14 inches. The death certificate change was made to provide more room in the medical certification section. The change in the fetal death report conforms to changes made in the birth certificate.

The 1989 revisions to the US Standard Certificates are intended to make the vital statistics system more responsive to the public health concerns of the coming decade. The implementation of these documents will require the cooperation and assistance of medical care providers, medical records and other hospital staff, funeral directors, and registrars of vital records. Working together, they can assure the availability of an accurate and complete data base that will continue to provide the states and the nation with the information needed to monitor and improve the health of its citizens.

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